**14.4 Guided Reading**

**Physical Science – Matter Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Per:\_\_\_**

1. Nuclear reactions are caused when an alteration of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of an atom occurs and the atom becomes unstable.
2. The fuel for a nuclear power plan is
   1. Carbon-14 b. Polonium c. Uranium-235
3. Complete the following table on nuclear decay.

|  |  |  |
| --- | --- | --- |
| **Type of decay** | **Protons** | **Neutrons** |
|  | -2 |  |
|  |  | -1 |
| Gamma decay |  | No change |

1. What is the difference between the two types of nuclear reactions that can occur during radioactive decay?
2. A half-life is the length of time it takes for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_of a radioactive element to decay.
   1. One-fourth b. one-half c. the entire amount
3. Radioactive dating is a way to determine the date of an object by measuring the amount of radioactive material and knowing the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_of the material.
4. Complete the following table that compares nuclear and chemical reactions.

|  |  |  |
| --- | --- | --- |
|  | **Chemical Reactions** | **Nuclear Reactions** |
| Part of atom involved |  |  |
| Reaction started by…. | High temperature, pressure,  increase in concentration,  Catalyst introduced | High temperture |
| Reaction result |  | Change in protons and  Neutrons, energy released |
| Relative amount of  Energy | Small |  |
| Examples | Digesting food, burning  fossil fuels |  |

1. Uranium-238 decays to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_as it ages.
   1. Carbon-14 b. Carbon-13 c. Lead-206
2. What is “isotope notation?”